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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/749,096

12/30/2003

Rafael Reif

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08/01/2005

DALY, CROWLEY, MOFFORD & DURKEE, LLP  
SUITE 301A  
354A TURNPIKE STREET  
CANTON, MA 02021-2714

EXAMINER

OWENS, DOUGLAS W

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 08/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

58

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/749,096	REIF ET AL.	
	Examiner	Art Unit	
	Douglas W. Owens	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 May 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 19 is/are rejected.
- 7) ☒ Claim(s) 12-18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 – 6, 10, 11 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,767,009 to Yoshida et al.

Regarding claim 1, Yoshida et al. teach a multi-layer integrated semiconductor structure (Figs. 1 – 12, for example), comprising:

a first semiconductor structure (42) having a plurality of semiconductor elements associated with a first semiconductor technology (Col. 9, lines 28 – 40);

a second semiconductor structure (41) having a plurality of semiconductor elements associated with a second semiconductor signaling technology; and

an interface (4, 18) disposed between a first surface of the first semiconductor structure to a first surface of the second semiconductor structure, wherein the interface includes a first portion (4) adapted to provide a communication interface between the first semiconductor structure and the second semiconductor structure and a second portion (18) adapted to reduce electrical interference between signals propagating along the first and second semiconductor structures (Col. 7, lines 20 – 23) with the first interface portion corresponding to a conductive bonding interface which secures the first

surface of the first semiconductor structure to the first surface of the second semiconductor structure.

Regarding claims 2 and 3, Yoshida et al. teach a multi-layer integrated semiconductor structure, wherein the first portion of the interface includes an electrically conductive adhesive material (Col. 6, lines 12 – 16).

Regarding claim 4, Yoshida et al., teach a multi-layer integrated semiconductor structure, wherein the second portion of the interface includes an electrically conductive adhesive material (Col. 4, lines 65 – 68; Col. 7, lines 39 – 45).

Regarding claim 5, Yoshida et al. teach a multi-layer integrated semiconductor structure, wherein the electrically conductive adhesive material is grounded (Col. 4, lines 49 – 57).

Regarding claim 6, Yoshida et al. teach a multi-layer integrated semiconductor structure, wherein the electrically conductive adhesive material includes one of copper, aluminum or a metal alloy (Col. 4, lines 65 – 68; Col. 7, lines 39 – 45).

Regarding claim 10, Yoshida et al. teach a multi-layer integrated semiconductor structure, wherein the first semiconductor signaling technology includes digital signaling related technology (Col. 9, lines 26 – 29; logic is related to digital signaling technology).

Regarding claim 11, Yoshida et al. teach a multi-layer integrated semiconductor structure, wherein the second semiconductor signaling technology includes analog signaling related technology (Col. 9, lines 31 – 33).

Regarding claim 19, Yoshida et al. teach a multi-layer integrated semiconductor structure, wherein both the first and second portions of said interface are provided from

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an electrically conductive bonding material. The material (Au, Sn-Pb, Cu, Al) used in the both portions are electrically conductive and can be used as a bonding material.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. as applied to claim 1 above, and further in view of US Patent No. 5,940,683 to Holm et al.

Regarding claim 7, Yoshida et al. teach a multi-layer integrated semiconductor structure, wherein the second portion of the interface includes a dielectric material (8, 16). Yoshida et al. do not teach that the dielectric material is a dielectric adhesive. Holm et al. teach a dielectric (52; Col. 7, lines 59 – 62) with adhesive properties. It would have been obvious to one having ordinary skill at the time of the invention to incorporate the teaching of Holm et al. into the structure taught by Yoshida et al. since it is desirable to prevent the electro-conductive layer from peeling.

Regarding claims 8 and 9, Yoshida et al. do not teach a structure, wherein the dielectric adhesive material includes an organic or inorganic material. Holm et al. teach a dielectric adhesive that may be organic or inorganic. It would have been obvious to incorporate the teaching of Holm et al. into the structure of Yoshida et al., for reasons

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discussed above. Additionally, it is desirable to use materials that are well suited for the intended use.

***Allowable Subject Matter***

5. Claims 12 – 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

6. Applicant's arguments filed May 27, 2005 have been fully considered but they are not persuasive.

Applicant argues that Yoshida et al. do not teach a structure "with at least one of the first and second interface portions corresponding to a conductive bonding interface which secures the first surface of the first semiconductor structure to the first surface of the second semiconductor structure". As seen in lines 14 – 36, for example, the first interface portion corresponding to a conductive bonding interface which secures the first surface of the first semiconductor structure to the first surface of the second semiconductor structure. The Ni-core Au bump is heated to secure the first surface of the first structure to the first surface of the second structure.

Applicant further argues that Yoshida et al. do not teach an electrically conductive adhesive material. As pointed out in the previous office action, this teaching can be found in lines 12 – 16 of Col. 6, where Yoshida et al. discloses an Au bump. It is of note that the only electrically conductive adhesive material disclosed in the specification is copper, gold, aluminum or a metal alloy, as cited in claim 6. Yoshida et

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al. discloses the claimed electrically conductive adhesive material. Applicant's arguments are confusing in this matter, since Applicant states that "the lines of Yoshida relied upon by Douglas W. Owens, the Examiner, do not make reference to any adhesive material", yet Applicant's disclosure cites the material disclosed by Yoshida et al. as being an electrically conductive adhesive material. Applicant further states that Col. 4, lines 65 – 68 and Col. 7, lines 39 – 45 do not describe an electrically conductive adhesive material. These passages cite aluminum and copper, which Applicant has described as an electrically conductive adhesive material.

7. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that the references do not teach a dielectric adhesive material that is organic or inorganic. This teaching can be found in lines 59 – 62 of Col. 7 of Holm et al.

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W. Owens whose telephone number is 571-272-1662. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven H. Loke can be reached on 571-272-1657. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Douglas W Owens  
Examiner  
Art Unit 2811

DWO